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## THE MORE IMPORTANT CLIMBING CUTWORMS.

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The term "climbing cutworm" is applied to those larvae which feed upon shrubs and trees, and normally spend the day in concealment on the ground. A great many species of larvae have this habit but the thirty species here described include all of these which have ever assumed importance as pests, in so far as the writer is aware, with the exception of *Polia subjuncta*.

Slingerland (5)<sup>1</sup> described and figured five species of climbing cutworms; Franklin (1) added figures and descriptions of six species; and Phipps (3, 4) has published data on twenty-six species with figures of twelve. Numerous additional references to climbing cutworms are scattered through the literature.

The following procedure is suggested in identifying larvae: Determine under a low power of the compound microscope whether the skin appears nearly or quite structureless, when it is said to be smooth, or whether definite structural units are visible, in which case the skin is said to be granulose; measure the basal width and height of the front (Pl. X, fig. D) and the length of the median line above the apex of the front with an ocular micrometer, taking these measurements as nearly as possible with the line of sight at right angles to the part to be measured; determine the position of setigerous tubercle O<sup>1</sup> (Pl. X, fig. 1) with regard to whether it is upon or posterior to a line which would connect the centers of ocelli IV and VI, and examine the inner (oral) face of the mandible, by inserting a scalpel or other thin object beneath the middle of the toothed margin and turning the mandible out-

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<sup>1</sup> Numbers in parentheses refer to the list under "Literature cited."

ward, to determine if a process or tooth is present on the first ventral rib (Pl. XI, fig. H). With this information committed to paper it should be possible to trace the larva quickly through the main divisions of the key, after which the specific determination usually can be made on characters which are readily seen.

The proportions of the front and length of the median line are somewhat variable, but probably never sufficiently variable to interfere with the correct determination of species as used in the key, and in occasional specimens the mandibular process may be entirely absent in species in which this process is normally present. It is best to examine several specimens in doubtful cases.

The writer wishes to express his appreciation of the kindness of several individuals who have furnished specimens upon which descriptions are based, as indicated herewith: Dr. J. McDunnough and H. F. Hudson, *Euxoa scandens*; C. R. Phipps, *Drasteria graphica atlantica*; Dr. H. J. Franklin, *Xylena nupera*; J. H. Hawkins, *Agrotis phyllophora* and *Polia purpurissata*; Dr. Harold Morrison and Carl Heinrich, *Homohadena badistriga*; A. R. Rolfs, *Lampra placida*.

A KEY TO THE MORE IMPORTANT CLIMBING CUTWORMS.

1. Prolegs absent on third abdominal segment and much reduced on fourth. Six pairs of setae ventrad of the spiracle on abdominal segment one. Setigerous tubercle VIII (the midventral pair) on abdominal segments one and two spiracle-like, without a seta (Pl. X, fig. G). Spinneret about five times as long as the labial palpus.

*Drasteria graphica* Hübner

Prolegs present on third abdominal segment. But five pairs of setae ventrad of the spiracle on abdominal segment one. Setigerous tubercle VIII normal with a setae (Pl. X, Fig. H). Spinneret at most not much longer than the labial palpus (Pl. X, Fig. E) . . . . . 2

2. Length of median line of head above apex of front equal to not more than one-third the height of the front. Adfrontal sutures terminating dorsally in or very near the apex of the occipital foramen. Skin granulose . . . . . 3  
 Length of median line of head above apex of front not less than one-half the height of the front. Adfrontal sutures terminating dorsally decidedly anterior to the apex of the occipital foramen. Skin usually smooth . . . . . 10
3. Skin pavement granulose. Setigerous tubercle II distinctly larger than I. Pigment reticulation of head replaced entirely by brownish or dark freckles . . . . . 4

Skin with coarse, isolated granules. Setigerous tubercle I nearly or quite as large as II. Head with pigment reticulation and without freckles.

*Feltia ducens* Walker

*Feltia subgothica* Haworth

4. Base of leg claw broadly rounded, not at all angulate (Pl. X, Fig. B). Each anterior proleg in mature larva with about sixteen to twenty-five crochets .....5

Base of leg claw normally acutely angulate (Pl. X, Fig. C). Each anterior proleg in mature larva with about six to fourteen crochets .....6

5. Middle coxae nearly or quite touching (Pl. XI, Fig. D). Spiracles elevated and slightly emarginate at ends (Pl. XI, Fig. C).

*Porosagrotis vetusta* Walker

Middle coxae distinctly separated (Pl. XI, Fig. E). Spiracles not elevated nor emarginate at ends (Pl. XI, Fig. B).

*Euxoa scandens* Riley

6. Freckles on head pale fuscous or brownish. Setigerous tubercle II about three times as large as I (Pl. X, Fig. A).

*Chorizagrotis auxiliaris* Grote

Freckles on head dark fuscous or black. Setigerous tubercle II about twice as large as I .....7

7. Middle coxae nearly or quite touching (Pl. XI, Fig. D). Head but slightly suffused with fuscous dorso-laterally. Markings centering upon the ocelli composed of distinctly separate spots.

*Euxoa messoria* Harris

Middle coxae distinctly separated (Pl. XI, Fig. E). Head heavily suffused with fuscous dorso-laterally. Markings centering upon the ocelli stripe-like.

*Euxoa tessellata* Harris

8. Each mandible with about nine distinct teeth. Head set medially with coarse, polished, convex round granules resembling minute ocelli.

*Homohadena badistriga* Grote

Each mandible with four or five teeth. Granules on head, when present, not as above .....9

9. Skin smooth. Dorsal setigerous tubercles very small or minute .....8

Skin granulose. Dorsal setigerous tubercles moderately large .....22

10. All setigerous tubercles on venter of abdominal segments one and two surrounded by a small but distinct dark pig-

- mented area. Basal width of front often greater than its height ..... 11
- Setigerous tubercles on venter of abdominal segments one and two consisting merely of a slender chitinous ring not surrounded by a dark area. Basal width of the front never greater than its height (Pl. X, Fig. D) ..... 27
11. Third (apical) segment of labial palpus as long as basal segment (Pl. X, Fig. E). Setigerous tubercle  $O^1$  (Pl. X, Fig. I) on or anterior to a line which would connect the centers of ocelli IV and VI, the tubercle somewhat removed from ocellus IV. Dark subdorsal spots on abdominal segment eight angulate on their dorsal face and hence broadest about midway of their length ..... 25
- Third segment of labial palpus less than half as long as the basal segment. Setigerous tubercle  $O^1$  posterior to a line which would connect the centers of ocelli IV and VI, the tubercle very close to ocellus IV. Dark subdorsal spots on abdominal segment eight absent or broadest posteriorly. 12
12. Spiracles entirely black. Dorsal setigerous tubercles small but distinct. Occipital angle decidedly acute. No process on base or first ventral rib of mandible. Median line of head above apex of front unusually short ..... 13
- Spiracles pale or pale brownish except in *phyllophora* in which the median line of the head is very long. Dorsal setigerous tubercles minute. Occipital angle moderately acute or approaching a right angle. A process usually present on base or first ventral rib of mandible (Pl. XI, Fig. H) ..... 14
13. Black submedian arcs of head confluent above the apex of the black front. Reticulation of head replaced by dark freckles. Cervical shield black except for pale longitudinal lines. No pale middorsal dots on abdominal segments. A V-shaped impressed figure anterior to each pair of prolegs except the anal. Tip of spinneret with a large acute notch.
- Agrotis fennica* Tauscher
- Black submedian arcs of head with a reticulate area between them above the apex of the pale front. Head without freckles. Cervical shield pale with brown pigment reticulation. A pale or orange middorsal dot on each abdominal segment, at least anteriorly. No V-shaped impression anterior to the prolegs. Tip of spinneret produced in setiform processes.
- Lycophotia saucia* Hübner
14. Length of median line of head above apex of front much greater than height of front. Spiracles dark brown or

black. A narrow but strong and continuous middorsal pale stripe.

*Agrotis phyllophora* Grote

Length of median line of head equal to or less than height of front. Spiracles pale or pale brownish. A pale middorsal line . . . . .15

- 15. Mandible without a process at base or on first ventral rib. Black subdorsal markings bordered ventrally by a broad, continuous line or stripe, tending to be well developed on all of the posterior abdominal segments, except on eight in *brunneicollis* . . . . .16

Mandible normally with a process on base or first ventral rib (Pl. XI, Fig. H). Black subdorsal markings bordered laterally by a slender, broken pale line, tending to be well developed on abdominal segments seven and eight only and including setigerous tubercle I on these segments only, if at all . . . . .17

- 16. Middle coxae distinctly separated (Pl. XI, Fig. E). Black subdorsal markings with an angular extension which includes setigerous tubercle I, markings strong on abdominal segment eight. An oval or V-shaped median area anterior to the prolegs on abdominal segments five and six bounded by small impressed lenticles (Pl. XI, Fig. A, a).

*Agrotis clandestina* Harris

Middle coxae touching (Pl. XI, Fig. D). Black subdorsal markings strong on abdominal segment seven but becoming obsolete on segment eight, not including setigerous tubercle I. A linear series of impressed transverse lenticles between and anterior to the prolegs.

*Lampra brunneicollis* Grote

- 17. Middle coxae touching (Pl. XI, Fig. D). Hind coxae nearly or quite touching . . . . .18
- Middle and hind coxae distinctly separated (Pl. XI, Fig. E) . . . . .19

- 18. Process on first ventral rib of mandible a simple triangle (Pl. XI, Fig. H). A minute pale spot on anterior margin of abdominal segments about on a line with setigerous tubercle II (surrounding the minute setigerous tubercle x). Basal width of front normally distinctly greater than its height.

*Agrotis c-nigrum* Linné

Process on first ventral rib of mandible complex (Pl. XI, Fig. F). A large pale dot on anterior margin of abdominal segments about on a line with setigerous tubercle II, and conspicuous if the surrounding dark pigmentation is de-

veloped. Basal width of front normally not greater than its height.

*Lampra cupida* Grote

- 19. Third segment of labial palpus minute, no longer than second segment. Black dashes normally present subdorsally anterior to setigerous tubercle II on at least some of the posterior abdominal segments, becoming somewhat triangular on abdominal segment eight .....20

Third segment of labial palpus twice as long as second segment (Pl. X, Fig. E). Black dashes anterior to setigerous tubercle II rarely indicated. Four (sometimes but two) subquadrate black spots on dorsum of abdominal segment eight, surrounding setigerous tubercle I and anterior to II.

*Agrotis plebeia* Smith

- 20. With a distinct large subdorsal dot on anterior margin of abdominal segments about on a line with setigerous tubercle II and conspicuous if the surrounding dark pigmentation is developed. A subdued band of pale flecks ventrad of the spiracles .....21

With a minute subdorsal dot on anterior margin of abdominal segments. A pale line ventrad of the spiracles.

*Lampra placida* Grote

- 21. With but one large, diffuse dorsal pale spot on each abdominal segment. Occipital foramen forming an angle of 70 to 75 degrees. Of western distribution.

*Lampra barnesi* Benjamin

With two smaller diffuse dorsal pale spots on each abdominal segment. Occipital foramen forming an angle of 80 to 85 degrees. Of general distribution.

*Lampra alternata* Grote

- 22. Median line of head above apex of front distinctly longer than the height of the front. Spiracles pale with black rims.

*Laphygma frugiperda* S. & A.

Median line of head above apex of front somewhat shorter than the height of the front. Spiracles deep brown or entirely black .....23

- 23. Cervical shield white with broad black anterior and lateral margins. A pair of large dark chitinous plates between each pair of prolegs except the anal. Setigerous tubercle O<sup>1</sup> on a line which would connect the centers of ocelli IV and VI. Frontal punctures (F<sup>a</sup>) well below the line of the frontal setigerous tubercles (F<sup>1</sup>).

*Eriopyga rufula* Grote

Cervical shield dark, nearly unicolorous, with white longitudinal lines. No chitinous plates between the prolegs ...24

24. Head smooth, shining. Skin finely pavement granulose. Setae of body minute, slender. Setigerous tubercles flat.

*Polia meditata* Grote

Head coarsely granulose. Skin set with coarse, isolated granules. Setae of body stout. Setigerous tubercles conical.

*Polia renigera* Stephens

25. Adfrontal areas (along lateral margins of front) conspicuous white. Markings of head black .....26

Adfrontal areas pale brown, the sutures pale but not white. Head a bright brown which may be somewhat infuscated in an area beside the base of the front.

*Prodenia eridania* Cramer

26. Head with conspicuous black submedian arcs but remainder of posterior half of head conspicuously reticulate throughout.

*Prodenia praefica* Grote

Submedian arcs of head indefinite, represented by a broad black area. Posterior half of head mostly black or infuscated, the reticulation obscure and usually visible at lateral margins only.

*Prodenia ornithogalli* Guénée

27. Hind coxae very widely separated .....28

Hind coxae nearly or quite touching .....29

28. Spiracles pale yellowish with black rims. Head with strong dark submedian arcs and full dark reticulation. Setigerous tubercles of front ( $F^1$ ) nearer to the puncture ( $F^a$ ) than to the lateral margin of front.

*Polia detracta* Walker

Spiracles entirely black. Anterior three-fourths of head solid black, without reticulation. Frontal setigerous tubercle distinctly nearer to the lateral margin of the front than to the puncture.

*Conistra sidus* Guénée

29. Spiracles orange with black rims. Length of median line of head above apex of front distinctly greater than the height of the front. Ocellus III more than its width from ocellus IV. Setigerous tubercles  $A^1$ - $A^2$ - $A^3$  forming not more than a right angle at  $A^2$ . Setigerous tubercles I and II (dorsal) on the abdomen in distinct round pale spots.

*Xylena nupera* Lintner

Spiracles pale or pale brown with black rims. Length of median line of head above apex of front less than height of front. Ocellus III about one-half its width from ocellus IV. Setigerous tubercles  $A^1$ - $A^2$ - $A^3$  forming a distinctly

obtuse angle at A<sup>2</sup> (Pl. X, Fig. F). Setigerous tubercles I and II not set in pale spots.

*Polia purpurissata* Grote

#### THE BLUEBERRY LOOPER

*Drasteria graphica* Hübner.

*Mature larva:* Head 2.9 mm. broad. Body about 26 mm. long and 3 mm. broad, first four abdominal segments of about equal width, tapering posteriorly; skin smooth; general color brown. Dorsum to and including setigerous tubercle II infuscated brown, the coloration made up of six narrow pale lines alternating with seven slender fuscous lines. Ventrad of this a broad pale band somewhat flecked with reddish. Including setigerous tubercle III and extending to well below the spiracles, a band of dorsal color bordered ventrally by a pale band flecked with reddish. Venter of dilute dorsal coloration flecked with reddish. Spiracles entirely black. Cervical shield and anal shield infuscated brown, the cervical shield with three pale longitudinal stripes. Head obscurely roughened, the brown adfrontal areas margined by narrow white stripes, a white stripe on median line above the front, remainder of head with three longitudinal white stripes which alternate with prominent reticulate stripes of infuscated brown. Front less than half the height of the head on the median line, white with a dark median stripe.

*Distribution:* Maine, Manitoba, British Columbia and south along the mountains to Colorado and Nevada.

*Food plants:* Has caused considerable injury to blueberry in Maine.

#### THE DINGY CUTWORM

*Feltia ducens* Walker.

*Feltia subgothica* Haworth.

*Mature larva:* Head 2.5 to 2.7 mm. broad. Body about 22 to 32 mm. long and 3.5 mm. broad, of nearly equal width throughout but tapering slightly posteriorly; skin set with coarse, isolated, shining, roundly subconical chitinous granules; general color pale grayish brown sometimes tinged with ferruginous. Dorsum paler than the supraspiracular area and sometimes bearing a segmental series of ovoid or rhomboidal infuscated markings. Supraspiracular area fuscous, flecked with white, darker subdorsally and forming definite dark fuscous spots subdorsally on at least the anterior half of each abdominal segment. A band of white



flecks below the spiracles. Spiracles entirely black. Head ground color very pale brownish gray or yellowish, with strong fuscous submedian arcs and fuscous or ferruginous reticulation.

*Distribution:* Occurs in the north throughout the breadth of the United States and Canada but is not usually common south of the latitude of Virginia, Tennessee, Missouri, Kansas, Colorado, and Utah.

*Food plants:* Buds and newer growth of apple and other trees and also many herbaceous plants.

#### THE SPOTTED-LEGGED CUTWORM.

*Porosagrotis vetusta* Walker.

*Mature larva:* Head 3.2 mm. broad. Body about 40 mm. long and 7 mm. broad, tapering on posterior half; skin very finely pavement-granulose; general color gray. Dorsum light gray without any ferruginous tinge, with traces of a white middorsal line and a pair of more or less fused white supra-spiracular lines. Venter, including the line of the spiracles, conspicuously splotched with white to base of prolegs but without any definite subspiracular pale band. Spiracles entirely black. Basal portion of claw of leg broadly rounded, without a trace of angulation. Ground color of head shield pale brownish gray overlaid closely with rather pale fuscous freckles which are darker posteriorly; submedian arcs represented by a fuscous shade.

*Distribution:* East of the Mississippi River this species occurs along the Atlantic Coast from Nova Scotia to Georgia and is also reported from Michigan. West of the Mississippi River the range includes Arizona, Colorado, California, Washington and British Columbia.

*Food plants:* Dewberry and peach buds and also many species of herbaceous plants.

#### THE WHITE CUTWORM.

*Euxoa scandens* Riley.

*Mature larva:* Head 3 to 3.2 mm. broad. Body about 35 mm. long and 6 mm. broad at middle, broadest through first four abdominal segments; skin finely pavement-granulose; general color white. Dorsum tinged with brownish intensified in a line just below setigerous tubercle II, suprspiracular area pale throughout with two pale lines indicated. Spir-

acles black. A band of white splotches below the spiracles. Venter pale. Setigerous tubercles pale fuscous, II scarcely twice as large as I. Cervical shield infuscated brownish with a symmetrical pattern of dark flecks and the anterior margin infuscated. Each anterior proleg with from eighteen to twenty-five crochets. Head pale brownish, the submedian arcs and reticulation replaced entirely by pale brown freckles which are denser posteriorly.

*Distribution:* New York, Indiana, Illinois, Missouri, Colorado, and Utah northward into Canada.

*Food plants:* Apple, bush fruits, pear, grape, peach and various succulent plants.

#### THE ARMY CUTWORM

*Chorisagrotis auxiliaris* Grote

*Mature larva:* Head 3.2 mm. broad. Body about 40 mm. long and 5 mm. broad, broadest through abdominal segments one to four; skin finely pavement-granulose; general color pale grayish much flecked with white, the dorsum tinged with brownish and with an indistinct band of white splotches below the spiracles. Cervical shield infuscated brownish, the median third of the anterior margin bearing a distinct dark fuscous area. Setigerous tubercle II usually three times as large as I. Claws of legs with the basal part strongly, acutely angulate. Spiracles entirely black. Head pale brownish gray, the infuscation arranged in pale infuscated brownish flecks somewhat darker posterior.

*Distribution:* The United States west of the Mississippi River, Canada and Mexico.

*Food plants:* Buds and newer growth of apple, apricot, blackberry, cherry, currant, goosberry, maple, peach, prune and raspberry and a wide variety of herbaceous plants.

#### THE DARK-SIDED CUTWORM

*Euxoa messoria* Harris.

*Mature larva:* Head 3.2 mm. broad. Body about 30 to 37 mm. long and 5 mm. broad, tapering gently posteriorly; skin set with minute, convex, contiguous granules; general color dark grayish. Dorsum brownish or ferruginous and sometimes distinctly reddish, especially posteriorly. Middorsal pale line broad, somewhat broken and broadly margined with fuscous. From subdorsally to the spiracles a fuscous band

bearing the usual pair of submedian pale lines. A distinct white band below the spiracles. Venter pale. Spiracles entirely black. Base of claw on leg with an acutely angulate basal tooth. Ground color of head grayish or whitish overlaid with close-set, small, dark fuscous freckles which are usually clearly composite, lines of flecks posterior to the ocelli usually paler and not fused into stripes, but little infuscation dorso-laterally.

*Distribution:* Canada and the United States as far south as the latitude of Tennessee and California.

*Food plants:* Buds and newer growth of apple, grape, peach and various shrubs and succulent plants.

#### THE STRIPED CUTWORM

*Euxoa tesellata* Harris

*Mature larva:* Head 3.2 mm. broad. Body about 32 mm. long and 5.5 mm. broad, tapering from the metathorax posteriorly; skin finely pavement-granulose; general color gray. Dorsum dull ferruginous. A middorsal and pair of supra-spiracular pale lines present. Supraspiracular area darker than the dorsum. A conspicuous white stripe below the spiracles. Venter uniformly pale. Claws of legs with a distinct, acutely angulate basal tooth. Ground color of head shield pale grayish heavily overlaid with infuscation posterolaterally, the reticulation replaced entirely by dark fuscous freckles which are fused to form stripes in the markings centering on the ocelli.

*Distribution:* The United States north of the latitude of the Ohio River and Virginia, and farther south in the Rocky Mountains. Also occurs in Canada.

*Food plants:* Buds and newer growth of apple, cherry, pear and plum, and various herbaceous plants.

#### THE WHITE-SPOTTED CUTWORM

*Homohadena badistriga* Grote

*Mature larva:* Head 2.5 mm. broad. Body about 35 mm. long and 5 mm. broad, metathorax and abdominal segments one to four of about equal width; skin appearing smooth, under a high power of the microscope it is seen to be set uniformly with extremely minute rounded granules; general color brown both dorsally and ventrally. Dorsum infuscated brown, a geminate middorsal pale line distinct on thorax and abdominal segments seven, eight and nine, less distinct

on others upon which it is expanded into a pale spot on the posterior third of the segment from which pale lines diverge through setigerous tubercles I and II of the following segment and converge to the pale spot. A pale spot dorsad of setigerous tubercle I. A strong pale line slightly ventrad of II below which is a fuscous stripe on the abdominal segments. Lower third of supraspiracular area, including the spiracles, infuscated brown; upper two-thirds, from just ventrad of III to the subdorsal fuscous stripe, nearly white, flecked with brown and with a brown line near the dorsal margin. Ventrad of the spiracles a pale stripe flecked with brown. Venter to base of prolegs brown, with a strong white line along the base of prolegs. Spiracles pale yellowish with black rims. Head pale brown. Adfrontal areas black, bordered laterally by a white stripe which is bordered by the black submedian arcs. A white stripe dorsad of the ocelli, through setigerous tubercle L<sup>1</sup>. The head is set regularly, medially with very coarse round, polished, convex granules resembling minute ocelli.

*Distribution:* Maine to Texas, west to Kansas and Colorado.

*Food plants:* Murtfeldt (2) records that larvae of this species were associated with those of (*Rhynchagrotis*) *Lampra alternata*, (*Peridroma*) *Lycophotia saucia* and *Euxoa scandens* in an outbreak in which oak, elm, apple, pear and cherry trees were damaged. This species normally feeds on honeysuckle and apparently has not been mentioned in economic literature since.

#### THE BLACK ARMY CUTWORM

*Agrotis fennica* Tauscher

*Mature larva:* Head 3 to 3.2 mm. broad. Body about 32 mm. long and 4.5 mm. broad, broadest through abdominal segments two, three and four; skin smooth; general color black or brownish black with pale stripes. Dorsum pale laterally, infuscated or black medially, the infuscation sometimes in the form of a segmental series of ovoid markings. From just ventrad of setigerous tubercle II to and partially including the spiracles, black, with a characteristic pale line near the dorsal margin. Below the spiracles a broad pale band with ferruginous center. Cervical shield black, shining, with only the median pale line present. Spiracles entirely black. Ground color of head yellowish brown, the front, adfrontal areas and a broad margin beside them solid black, reticulation replaced entirely by pale infuscated freckles which are arranged in stripes posterior to the ocelli.

*Distribution:* In the latitude of New York, Minnesota and British Columbia and northward.

*Food plants:* Buds and newer growth of apple, blueberry, cherry, poplar, willow, sumach and a great variety of other trees and herbaceous plants.

#### THE VARIEGATED CUTWORM

*Lycophotia saucia* Hübner.

*Mature larva:* Head 3 to 3.2 mm. broad. Body about 40 mm. long and 6 mm broad, the posterior extremity somewhat enlarged and very blunt; skin smooth; general color varying from very pale gray to the more usual dark fuscous, ground color a dirty yellowish gray. The pale middorsal line is represented on the first four abdominal segments by a distinct yellow or orange dot which may also occur on some of the following segments. A fuscous W-shaped mark, open anteriorly, on the dorsum of abdominal segment eight, followed by a conspicuous yellowish or orange area. Subdorsally a segmental series of linear black spots bordered ventrally by a broken yellowish or orange line which forms an inconspicuous dot about midway of each segment. Supraspiracular area occupied by an inconspicuous, sinuous band of fuscous which is narrowed, or more or less obsolete at the spiracles. Below the spiracles is a border of mingled orange and yellow. Venter pale flecked with white. Spiracles entirely black. Cervical shield with pigment reticulation. Head whitish with broad black submedian arcs and more or less fuscous reticulation.

*Distribution:* United States and Canada.

*Food plants:* Apple, apricot, blackberry, box elder, cedar, cherry, currant, gooseberry, grape, honey locust, lemon, maple, mulberry, orange, osage orange, peach, plum, prune, raspberry, sumach, willow and a great variety of herbaceous plants.

#### THE UNMARKED CUTWORM

*Agrotis phyllophora* Grote

*Mature larva:* Head 3 mm. broad. Body about 35 mm. long and 6 mm. broad at middle, abdominal segments of about equal width with seven and eight somewhat broader; skin smooth, with a metallic sheen; general color reddish brown. Coloration made up of fuscous or black flecks on a reddish brown ground. A narrow but strong and continuous middorsal pale stripe strongly outlined in fuscous and

extending across the anal shield. Fuscous flecks concentrated dorsally and thinning out toward the spiracles, fused to form definite spots dorsad of setigerous tubercles I and II. No trace of a subdorsal pale line ventrad of setigerous tubercle II or of a segmental series of subdorsal dark markings. Oblique pale triangles indicated posterior to II. Spiracles entirely black. Subspiracular pale stripe not evident in alcoholic specimens. Venter of dilute dorsal coloration. Cervical shield brownish, reticulate with fuscous. Head a decided brown with darker brown submedian arcs and reticulation.

*Distribution:* Massachusetts, New York and Wisconsin, northward into Canada.

*Food plants:* Phipps (4) states that wild cherry seems to be the preferred food plant but that the larva accepts alder, birch, blueberry, *Spiraea*, *Viburnum* and willow.

#### THE W-MARKED CUTWORM

*Agrotis clandestina* Harris

*Mature larva:* Head 2.7 mm. broad. Body about 28 to 35 mm. long and 5 mm. broad, abdominal segments about of equal width throughout; skin smooth; general color varying from pale gray to dark gray.

Dorsum nearly uniformly infuscated, of nearly the same shade as the supraspiracular area or darker, sharply defined even on the thorax. A broken pale middorsal line. A segmental series of black subdorsal markings not wedge-shaped except on abdominal segments seven and eight, with an angular extension which includes setigerous tubercle I and tending to occur on all abdominal segments. The subdorsal black marks bordered ventrally by a distinct white line broadened beside the black marks, reaching setigerous tubercle II, and connected on each abdominal segment with a wedge-shaped pale mark posterior to the black spot extending obliquely upon the following segment. Supraspiracular area nearly uniformly infuscated except that in the line of the spiracles the infuscation is intensified and in an obscure oblique dark stripe originating at the anterior margin of each abdominal segment and extending dorso-posteriorly. Spiracles pale yellowish with black rims. A band of pale flecks ventrad of the spiracles. Venter of dilute dorsal coloration much flecked with white. Cervical shield pale reticulate with black. Head pale brownish with black submedian arcs and reticulation.

*Distribution:* Kentucky, Missouri, Kansas, Colorado, Utah, Nevada and California northward into Canada.

*Food plants:* Buds and newer growth of apple, box elder, currant, gooseberry, grape, maple, peach, raspberry and a great variety of herbaceous plants.

#### THE DASH-MARKED CUTWORM

*Lampra brunneicollis* Grote

*Mature larva:* Head 3 mm. broad. Body about 32 mm. long and 6 mm. broad at middle, abdominal segments of about equal width throughout; skin smooth; ground color of about yellowish gray strongly infuscated dorsally and in a stripe occupying somewhat more than the ventral half of the supraspiracular area and including the spiracles. A strong pale middorsal line. A segmental series of subdorsal black dashes on the abdomen anterior to setigerous tubercle II showing no tendency to become wedge-shaped posteriorly and obsolete on abdominal segment eight. A somewhat oblique pale area posterior to each black dash. Bordering the black dashes ventrally is a pale yellowish stripe bordered by fuscous lines. Upper part of supraspiracular area pale yellowish flecked with fuscous. Spiracles pale with black rims. A distinct white subspiracular band flecked with fuscous. Venter of dilute dorsal coloration, the infuscation thinning out midventrally. Cervical shield pale reticulate with brown. Head brown, with dark submedian arcs and reticulation.

*Distribution:* Virginia, Tennessee, Kansas and Colorado northward into Canada.

*Food plants:* Phipps (4) lists blueberry (*Vaccinium pennsylvanicum*), dandelion and sweet fern (*Myrica asplenifolia*) and I have collected and reared the larva on a number of low herbs.

#### THE SPOTTED CUTWORM

*Agrotis c-nigrum* Linnaeus.

*Mature larva:* Head 3 mm. broad. Body about 35 mm. long and 4.5 to 6.5 mm. broad, abdominal segments of about equal width throughout; skin smooth; general dorsal color varying from brown to a dark uniform drab on a pale yellowish gray ground, and with a metallic sheen. Subdorsally a segmental series of sooty black, wedge-shaped spots obsolete anteriorly. No trace of dark spots above the spiracles. Cervical shield reticulate with infuscated brown, the lateral pale stripes usually not well defined. Spiracles

yellowish or whitish with black rims. Head shining, ground color whitish with black submedian arcs and reticulation, the arcs rather angularly diverging at the apex of the front and enclosing a large reticulate area above the front. Each mandible with a large, bluntly triangular tooth basally on the first ventral rib.

*Distribution:* Virginia, Tennessee, Missouri, Kansas, Arizona, and northward into Canada.

*Food plants:* Buds and newer growth of apple, cranberry, currant, gooseberry, maple and pear, and a great variety of herbaceous plants.

#### THE BROWN CUTWORM

##### *Lampra cupida* Grote

*Mature larva:* Head 2.3 to 3.2 mm. broad, unusually variable. Body about 25 mm. long and 4.5 mm. broad, abdominal segments of about equal width throughout; skin smooth; general dorsal color nearly uniform to and including the spiracles except for a broad, broken pale middorsal line which is diffused to form two indefinite pale spots on each abdominal segment, and a segmental series of black subdorsal markings. These markings are more pronounced and wedge-shaped posteriorly. They fade out dorsally, are sharply defined ventrally and are bordered ventrally by a broken pale line. A distinct, round, subdorsal dot of yellowish white on the anterior margin of each abdominal segment about on a line with setigerous tubercle II. Spiracles pale brownish with black rims. A broad pale band below the spiracles, flecked with fuscous and pinkish. Venter pale. Cervical shield reticulate with brown. Under color of head a distinct pale brown with black submedian arcs and reticulation, the arcs tending to fade out anteriorly.

*Distribution:* Virginia, Ohio, Indiana, Illinois, Kansas and Colorado northward into Canada and also reported from North Carolina, Texas and New Mexico.

*Food plants:* Buds and newer growth of apple, grape and peach.

#### THE NORTHWESTERN CLIMBING CUTWORM

##### *Agrotis plebeia* Smith

*Mature larva:* Head 3 mm. broad. Body about 30 mm. long and 5 mm broad at middle, abdominal segments of about equal width with segment eight somewhat broadened; skin smooth; general dorsal color varying from very pale



gray through dark gray and dark brown to blackish. Dorsal coloration nearly uniform, a fuscous reticulation on a pale or pale brownish yellow ground, to and partially including the spiracles except for intensification of the dark coloration at the juncture of the abdominal segments middorsally where the pale line is interrupted and sometimes in the line of the spiracles. Pale middorsal line expanded to form two indefinite, diffuse spots on each abdominal segment. Traces of a segmental series of oblique subdorsal pale triangles which would outline a dorsal series of dark markings but these dark dorsal markings are not distinctly developed. Dark dashes anterior to setigerous tubercle II rarely indicated on some posterior abdominal segments. Four (sometimes but two) subquadrate black spots on the dorsum of abdominal segment eight. A subdorsal pale line. Spiracles white with black rims. A pale or yellowish subspiracular band. Venter of very dilute dorsal coloration much flecked with white. Head pallid with fuscous or black submedian arcs and reticulation.

*Distribution:* Oregon, Washington and British Columbia.

*Food plants:* Apple, cherry, hazel, loganberry, raspberry, thimbleberry (*Rubus parviflorus*), rhododendron (*Rhododendron californicum*) and willow.

#### THE RED CUTWORM

*Lampra placida* Grote

*Mature larva:* Head 2.2 mm. broad. Body about 20 mm. long and 4 mm. broad, abdominal segments slightly broadened posteriorly; skin smooth; general color faintly brownish gray.

Dorsum to and including the spiracles of uniform coloration except as noted below, and coloration made up of flecks and reticulation of fuscous on a pale ground faintly suffused with pinkish. Middorsal pale line slender, broken. Indistinct pale wedge-shaped marks originating on the subdorsal line ventrad of setigerous tubercle II and extending dorso-posteriorly upon the following segment outlining a segmental series of shield-shaped dorsal markings which are darker at the margins. Subdorsal pale line very slender and much broken. Bordering the subdorsal pale line dorsally on anterior half of abdominal segments (except posteriorly on abdominal segment eight) is a segmental series of linear black marks which are sublinear even on abdominal segments seven and eight, joined on the posterior margin of seg-

ment eight. Spiracles yellowish white with black rims. A well-defined white line below the spiracles, no subspiracular pale stripe. Venter pale much flecked with white. Cervical shield white flecked with black. Head very pale brownish, almost whitish, with dilute fuscous submedian arcs and reticulation.

*Distribution:* From New Mexico, Arizona, and Nevada northward into Canada, and also in New York and Maine.

*Food plants:* Buds and younger growth of apple, cottonwood, *Crataegus*, grape, greasewood (*Sarcobatus vermiculatus*) and poplar.

#### BARNES' CLIMBING CUTWORM

*Lampra barnesi* Benjamin

*Mature larva:* Head 3 mm. broad. Body about 30 mm. long and 5 mm. broad, of about equal width throughout; skin smooth; general color mottled gray. Ground color light gray, sometimes tinged faintly with brownish, overlaid dorsally, to and including the spiracles, with fuscous or black which does not vary greatly in intensity except in a distinct segmental series of linear to wedge-shaped dark subdorsal markings. These markings are more pronounced posteriorly, fade out dorsally, are sharply defined ventrally and are not margined exteriorly by a pale line. A single, indefinite, diamond-shaped, pale middorsal spot about midway of the length of each of the abdominal segments, more or less outlined with fuscous and including the usual pair of slender, transverse, dark lines. A distinct round, pale subdorsal dot on the anterior margin of each abdominal segment about on a line with setigerous tubercle II. Spiracles pale yellowish or white with black rims. An indefinite, subdued band of pale flecks ventrad of the spiracles. Cervical shield reticulate with fuscous. Head ground color pale gray with the submedian arcs and reticulation fuscous or ferruginous, the arcs tending to be reticulate or dilute anteriorly.

*Distribution:* Colorado, Arizona, Utah, California and Washington.

*Food plants:* Considerable damage to peach buds is reported from Colorado, and Washington.

#### THE MOTTLED-GRAY CUTWORM

*Lampra alternata* Grote

*Mature larva:* Head 2.6 to 3 mm. broad. Body about 30 to 35 mm. long and 5 mm. broad, of practically equal width

throughout; skin smooth; general dorsal color pale gray to infuscated brown, the infuscation intensified at juncture of segments middorsally and in the line of the spiracles. Supraspiracular area not differentiated. A segmental series of subdorsal dark markings usually indicated at least posteriorly. A pair of slender transverse dark lines a little anterior to the middle of each abdominal segment middorsally and an obscure, diffuse, pale area both anterior and posterior to these lines forming two indefinite pale spots. A distinct round subdorsal dot on each segment beginning with the metathorax, about on a line with setigerous tubercle II. Spiracles pale brownish with black rims. An indefinite, pale subspiracular stripe. Venter of dilute dorsal coloration. Cervical shield reticulate with fuscous. Head gray with fuscous submedian arcs and reticulation, the submedian arcs tending to fade out anteriorly.

*Distribution:* Massachusetts, New York, Tennessee, Illinois, Missouri, Colorado and Arizona northward into Canada.

*Food plants:* Buds of apple, hickory, oak and walnut and probably various other trees and herbaceous plants.

#### THE FALL ARMYWORM

*Laphygma frugiperda* S. & A.

*Mature larva:* Head 2.6 to 2.8 mm. broad. Body about 25 to 36 mm. long and 3 to 5 mm. broad, abdominal segments of practically uniform width throughout; skin set very closely with small, round, convex granules; general color varying from pinkish through yellowish, olivaceous and dull gray to almost black. Dorsal area of general color overlaid with strands and flecks of brownish or fuscous, the middorsal yellowish line subdued in color but broad and sharply defined. A broad yellowish subdorsal line just below setigerous tubercle II. An infuscated band from tubercle II to the spiracle intensified on its dorsal margin to form black dashes on the anterior half of each abdominal segment. Below the spiracles a broad, sharply defined yellow or whitish band more or less mottled with ferruginous. Spiracles pale with black rims and margined with whitish. Setigerous tubercles moderately large, nearly flat, dark dorsally, paler ventrally. Head grayish, pale yellowish or brownish, the adfrontal areas and adjacent margin white, submedian arcs rather slender, reticulation close, ferruginous or brownish more infuscated dorsally and merging into stripes laterally.

*Distribution:* Massachusetts to Florida and westward to New Mexico, Colorado, Wyoming and Montana. Most common in the southern portion of this range.

*Food plants:* Prefers cereals and grasses but will attack a wide variety of plants including cranberry, grape, orange, peach and various other trees and shrubs.

#### THE BRASSY CUTWORM

##### *Eriopyga rufula* Grote

*Mature larva:* Head 2.5 mm. broad. Body about 28 mm. long and 4 mm. broad, of about equal width throughout; skin finely pavement-granulose, the dark areas with obscure, coarse, flattened granules; general color dark, tinged dorsally with pinkish and with a brassy sheen. Dorsal area to slightly ventrad of setigerous tubercle II, pale gray tinged with pinkish and with a segmental series of ovoid infuscated markings. A broken pale middorsal line more distinct toward posterior margin of segments. Traces of a pale line slightly ventrad of setigerous tubercle II; from this to base of prolegs infuscated, darker dorsally and gradually more dilute ventrally, with traces of a pale band below the spiracles. Spiracles dark brown with black rims. Cervical shield white with broad black anterior and lateral margins, the white area occupying more than half of the antero-posterior length of the cervical shield. Head pale with broad black submedian arcs and black reticulation.

*Distribution:* This species is known from Colorado, Utah, California, Oregon and Washington.

*Food plants:* Apple, apricot, peach, pear and plum, and various herbaceous plants.

#### THE PINK-BACKED CUTWORM

##### *Polia meditata* Grote

*Mature larva:* Head 2.3 to 2.5 mm. broad. Body about 25 to 30 mm. long and 5 mm. broad, abdominal segments of about equal width throughout; skin finely pavement-granulose; general color a dark drab specially anteriorly, more or less suffused with pinkish especially posteriorly. Dorsal area pale with an included segmental series of infuscated rhomboidal or ovoid markings at least posteriorly. Supraspiracular area fuscous, intense dorsally on the abdomen except at juncture of the segments and fading out below. Venter sordid, closely flecked with white especially in an area just below the

spiracles. Cervical shield deep fuscous with three pale pinkish stripes. Spiracles black. Head smooth, shining, ground color pale yellowish, the submedian arcs and heavy reticulation fuscous.

*Distribution:* Reported along the Atlantic Coast from New Hampshire to North Carolina and westward to Tennessee, Illinois, South Dakota, Missouri and Kansas. Also found in Canada.

*Food plants:* Apple and grape and also many species of herbaceous plants.

#### THE BRISTLY CUTWORM

*Polia renigera* Stephens

*Mature larva:* Head 2 to 2.1 mm. broad. Body about 20 to 30 mm. long and 4.5 mm. broad, very slightly broadest through the first four abdominal segments; skin set with coarse, isolated, somewhat retrorse, subconical granules; general color pale grayish. Dorsal area pale, including an infuscated band constricted at the juncture of the segments to form a series of rhomboidal or ovoid markings. Subdorsally an inconspicuous pale stripe more or less flecked with ferruginous or brownish. Upper half of supraspiracular area bearing a prominent black stripe. Lower half of supraspiracular area dilute fuscous, much flecked with white. A well defined pale band below the spiracles. Venter sordid, much flecked with white. Cervical shield dark fuscous with pale lines. Spiracles nearly black. Head coarsely granulose, ground color grayish brown, the submedian arcs fuscous and nearly entirely concealing the ground color dorsally.

*Distribution:* Occurs throughout the United States east of the Mississippi River and is reported in the west from North Dakota, Nebraska, Kansas, Colorado and New Mexico. Also found in Canada.

*Food plant:* Apple, cottonwood and grape, and many species of herbaceous plants.

#### THE SEMITROPICAL ARMY WORM

(*Prodenia*) *Xylomyges eridania* Cramer

*Mature larva:* Head 2.6 mm. broad. Body about 38 mm. long and 5 mm. broad, abdominal segments of practically uniform width throughout, segment eight somewhat enlarged; skin smooth; general dorsal color a deep, uniform gray sometimes tinged with olivaceous or pinkish. Middorsal line, subdorsal stripe, and subspiracular stripe unicolorous, whitish

tinged with orange or pinkish, the subspiracular stripe much the broadest. Laterally on the dorsum a segmental series of black triangles angulate on their dorsal faces. Ventral half of supraspiracular area dark fuscous, dorsal half paler. Venter pale, suffused with pinkish or orange and much flecked with white. Ground color of head yellow heavily overlaid with bright reddish brown reticulation which is more or less fused forming solid areas of reddish brown; without traces of solid black as found in *ornithogalli* except occasionally in a small area beside the base of the front; adfrontal sutures pale but not white.

*Distribution:* Georgia, Florida, Texas and California, and occasionally is found as far north as Tennessee.

*Food plants:* Avocado, castor bean, citrus trees, and willow and also many herbaceous plants.

#### THE SOUTHWESTERN ARMY WORM

*Prodenia praefica* Grote

*Mature larva:* This larva closely resembles *Prodenia ornithogalli* in coloration but may be readily distinguished by the distinct fuscous reticulation on the posterior half of the head.

*Distribution:* Reported from California only.

*Food plants:* Grape, peach and various herbaceous plants.

#### THE COTTON CUTWORM OR YELLOW-STRIPED ARMY WORM

*Prodenia ornithogalli* Guénée

*Mature larva:* Head 2.8 to 3 mm. broad. Body about 20 to 36 mm. long and 6 mm. broad at middle, enlarged on metathorax, on abdominal segments one and two, and slightly on abdominal segments seven and eight; skin smooth; varying in general color from pale grey to jet black. In well marked individuals the dorsal coloration is made up of intermingled strands of pale and fuscous; the subdorsal triangular dark markings, which are broadest about midway of their length, may be conspicuous on all the abdominal segments or may be obsolete on all but segment eight; there may be a bright yellow band ventrad of the black subdorsal triangles or this may be wholly absent; the upper half of the supraspiracular area is pale with pale and fuscous lines medially; the lower half of the supraspiracular area, including the spiracles, is usually fuscous and there is a subspiracular band of white flecks more or less suffused with orange or pinkish. Spiracles brownish with dark rims. Ground color of head brown over-

laid and all but concealed dorsally by deep fuscous, obscurely reticulate laterally, adfrontal areas and adjacent margin of head shield conspicuous white.

*Distribution:* From Massachusetts and New York to Florida and westward to Minnesota, Nebraska, New Mexico, Arizona and California, but is usually common only in the area south of the latitude of the Ohio River.

*Food plants:* Cottonwood, peach and raspberry; and a large number of herbaceous plants.

#### THE SILKY CLIMBING CUTWORM

##### *Polia detracta* Walker

*Mature larva:* Head 3 mm. broad. Body about 22 mm. long and 4 mm. broad at middle, about of equal width to the sixth abdominal segment, abdominal segments seven and eight rather strongly broadened; skin smooth with a silky sheen; general color dark brown flecked with white.

Dorsal area brown with pale middorsal line obsolete except at the extremities and with triangular pale areas on the posterior half of abdominal segments next to the pale subdorsal line. Supraspiracular area darker dorsally growing gradually more speckled with pale ventrally. Spiracles pale yellowish with black rims. A pale supraspiracular band. Venter dilute brownish flecked with white. Cervical shield polished black with three strong pale lines, the part ventrad of the subdorsal line brown. Anal shield brown with a black median area traversed by the pale middorsal line. Head smooth, brown, the front and laterally to the ocelli uniform dusky gray, strong dark submedian arcs enclosing a large reticulate area above the apex of the front. A dark stripe mediad of the ocelli and similar stripes posterior to them, remainder of the head with close dark reticulation.

*Distribution:* Maine to Wisconsin and British Columbia and southward to Virginia, Tennessee and New Mexico.

*Food plants:* Buds of oak. Phipps (4) also lists gray birch (*Betula populifolia*), blueberry (*Vaccinium canadense* and *V. pennsylvanicum*), dandelion, and service berry (*Amelanchier spicata*).

#### THE BLACK-FACED CLIMBING CUTWORM

##### *Conistra sidus* Guénée

*Mature larva:* Head 3.2 mm. broad. Body about 28 mm. long and 5 mm. broad, broadening gradually posteriorly to

abdominal segment eight; skin smooth; general color a deep velvety brown, with obscure pale middorsal and subdorsal lines, the latter usually prominent on the cervical shield. Coloration above the spiracles of one practically uniform shade. Venter paler than the dorsum and strongly suffused with reddish, with a narrow yellowish band below the spiracles. Spiracles entirely black. Cervical shield black, the posterior margin brown. Anterior two-thirds of head heavily overlaid with dark fuscous, posterior third abruptly brownish yellow.

*Distribution:* Virginia, Tennessee, Missouri, Texas and northward.

*Food plants:* Azalea, apple, blackberry, hickory, oak, peach and wild cherry, and also tobacco and probably other herbaceous plants.

#### THE FALSE ARMYWORM

*Xylena nupera* Lintner

*Mature larva:* Head 4.8 mm. broad. Body about 40 mm. long and 6.5 mm. broad at middle, abdominal segments of about equal width throughout but tapering slightly posteriorly, skin smooth; occurs in both a green and a brown phase, the dark markings being less intense in the green phase. Dorsum to well below setigerous tubercle II dark with a strong, continuous pale middorsal line and bordered laterally by a yellowish line. Below this and partially including the spiracles a broad band of pinkish brown or green becoming gradually darker ventrally and particularly in the line of the spiracles. Spiracles orange with black rims. A yellow stripe below the spiracles. Venter pinkish or green. Cervical shield and anal shield of one nearly solid color, varying with the phase of the larva, with three pale longitudinal stripes. All setae above the line of the spiracles set in round pale spots. Head greenish yellow, unmarked except for faint pinkish reticulation, pavement granulose throughout and with scattered coarse granules.

*Distribution:* District of Columbia, Nebraska, Oregon and northward into Canada.

*Food plants:* Apple, cranberry and various herbaceous plants.

#### THE BLUEBERRY CUTWORM

*Polia purpurissata* Grote

*Mature larva:* Head 3.5 mm. broad. Body about 34 mm. long and 6 mm. broad at middle, abdominal segments of



about equal width throughout; skin smooth; general color grayish brown somewhat suffused with pinkish.

Dorsum to and partially including the spiracles flecked with fuscous which is concentrated somewhat along the broken, indistinct pale middorsal line. Spiracles pale or pale brownish with black rims. A white subspiracular stripe. Venter pale. No other markings. Cervical shield somewhat darker than surrounding areas. Head brown with obscure darker submedian arcs and reticulation.

*Distribution:* Reported from Quebec, Maine, New York, Colorado, Utah and British Columbia, and said to be most common in Quebec and Maine.

*Food plants:* Phipps (4) lists blueberry (*Vaccinium canadense* and *V. pennsylvanicum*) and sweet fern (*Myrica asplenifolia*). In addition he names a number of trees and shrubs which the larva accepted readily in confinement.

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#### PLATE X.—CLIMBING CUTWORM STRUCTURES.

- A. Diagram of first abdominal segment of larva: I, II, III, IV, V, VI, VII<sup>a</sup>, VII<sup>b</sup>, VIII setigerous tubercles; *Sp* spiracle; *a* dorsal area; *b* subdorsal area; *c* suprspiracular area; *d* subspiracular stripe; *e* venter.
- B. *Euxoa scandens*: End of leg showing shape of claw.
- C. *Euxoa messoria*: End of leg showing shape of claw.
- D. Front and adjacent areas of larva showing method of measuring basal width and height of front.
- E. Anterior end of mentum or "lower lip," ventral view: *S* spinneret; *LP* labial palpus; I, II, III segments of labial palpus.

- F. Head of larva, dorsal view: I, II, III, IV ocelli; *Adfa* adfrontal area; *F* front; *F*<sup>1</sup> frontal setigerous tubercle; *F*<sup>a</sup> frontal puncture; *S* adfrontal suture; *A*<sup>1</sup>, *A*<sup>2</sup>, *A*<sup>3</sup> anterior setigerous tubercles; *L*<sup>1</sup> lateral setigerous tubercle; *OF* occipital foramen; *OA* occipital angle; *M* median line of head.
- G. *Drasteria graphica*: Diagram of venter of first abdominal segment, *VIII* setigerous tubercle VIII.
- H. *Euxoa scandens*: Diagram of venter of first abdominal segment, *VIII* setigerous tubercle VIII.
- I. Head of larva, lateral view: I, II, III, IV, V, VI ocelli; *A*<sup>1</sup>, *A*<sup>2</sup>, *A*<sup>3</sup> anterior setigerous tubercles; *O*<sup>1</sup> ocellar setigerous tubercle one; *L*<sup>1</sup> lateral setigerous tubercle.

PLATE XI.—CLIMBING CUTWORM STRUCTURES.

- A. *Agrotis clandestina*: Portion of fifth abdominal segment, ventral view; *a* area anterior to prolegs bounded by impressed lenticles.
- B. *Euxoa scandens*: Fourth abdominal spiracle.
- C. *Porosagrotis vetusta*: Fourth abdominal spiracle.
- D. *Porosagrotis vetusta*: Middle coxae nearly or quite touching.
- E. *Euxoa scandens*: Middle coxae distinctly separated.
- F. *Lampra cupida*: Process on first ventral rib of mandible (shown in black) having a complicated structure.
- G. *Polia detracta*: Hind coxae very widely separated.
- H. *Lampra barnesi*: Process on first ventral rib of mandible (shown in black) in the form of a simple triangle.